



Model ***TVX4151***
(QZ-1113K)

Printed in Japan 298-5248-00 MAY 1995 (B) T V X4 151

TVX-151

■ FEATURES

● 4-inch Color LCD

The TVX4151 uses a 4-inch TFT active matrix drive type color LCD (Liquid Crystal Display) panel providing powerful pictures.

● Various Tuning Methods

TV stations can be tuned in easily using preset tuning (six stations each for VHF and UHF) manual tuning, and auto tuning.

● Push Up/Down Operation for Good Operability

A push up/down operation is used to adjust the brightness and color density so the picture can be easily adjusted to suit your tastes.

● Designed for Driving Safety

- The liquid crystal panel is automatically drawn back into the main unit after approximately 10 seconds if it is pulled out and left in the horizontal position.
- To prevent accidents, the picture turns off and only the sound can be heard when the car is moving.
- The LCD panel can be adjusted freely (stepless) to any angle between vertical and 45°.

● Built-in FM Modulator

The TVX4151 includes a built-in FM modulator so it can easily be connected to FM radios (combination units).

■ CD AUTO CHANGER DISPLAY SCREEN ERROR MODE TABLE

Error display	Name of error	Description
ERROR-1	Memory error	This error occurs if the disc loading data, etc., is lost due to wear of the CD auto changer's battery. (insert an empty magazine and eject it to return to the first disc.) Note: Remove all the discs from the magazine, insert the empty magazine and press the eject key.
ERROR-2	Mechanical error	This error occurs if there is a problem with the mechanism and the eject or disc selection operation is not completed in the specified amount of time. (Have the CD auto changer serviced.)
ERROR-3	Functional error	This error occurs if the pickup cannot focus after several tries due to scratches on the disc, signal interference, etc. (Replace the disc.)
ERROR-5	Data disc	This error occurs if a CD-ROM or other data disc is inserted. "ERROR-5" is displayed for 5 seconds, and the next disc is selected.
ERROR-6	Disc error	This error occurs when the disc is loaded upside-down, etc. "ERROR-6" is displayed for 5 seconds, and the next disc is selected. (Reload the disc properly.)
HI-TEMP	Temperature error	This error occurs when the CD mechanism's temperature sensor detects that the temperature is high. Wait until the temperature returns to normal to play discs.

■ SETTING THE COUNTRY RECEPTION MODE

Broadcast channels differ from country to country. Use the following procedure to set the broadcast channels for the country to be received.

1. Press the FUNC button and the MEMO/Channel CALL/RPT button simultaneously for at least 5 seconds.

(The country reception mode setting screen appears. The mode is set to "1 Singapore" upon shipment from the factory.)

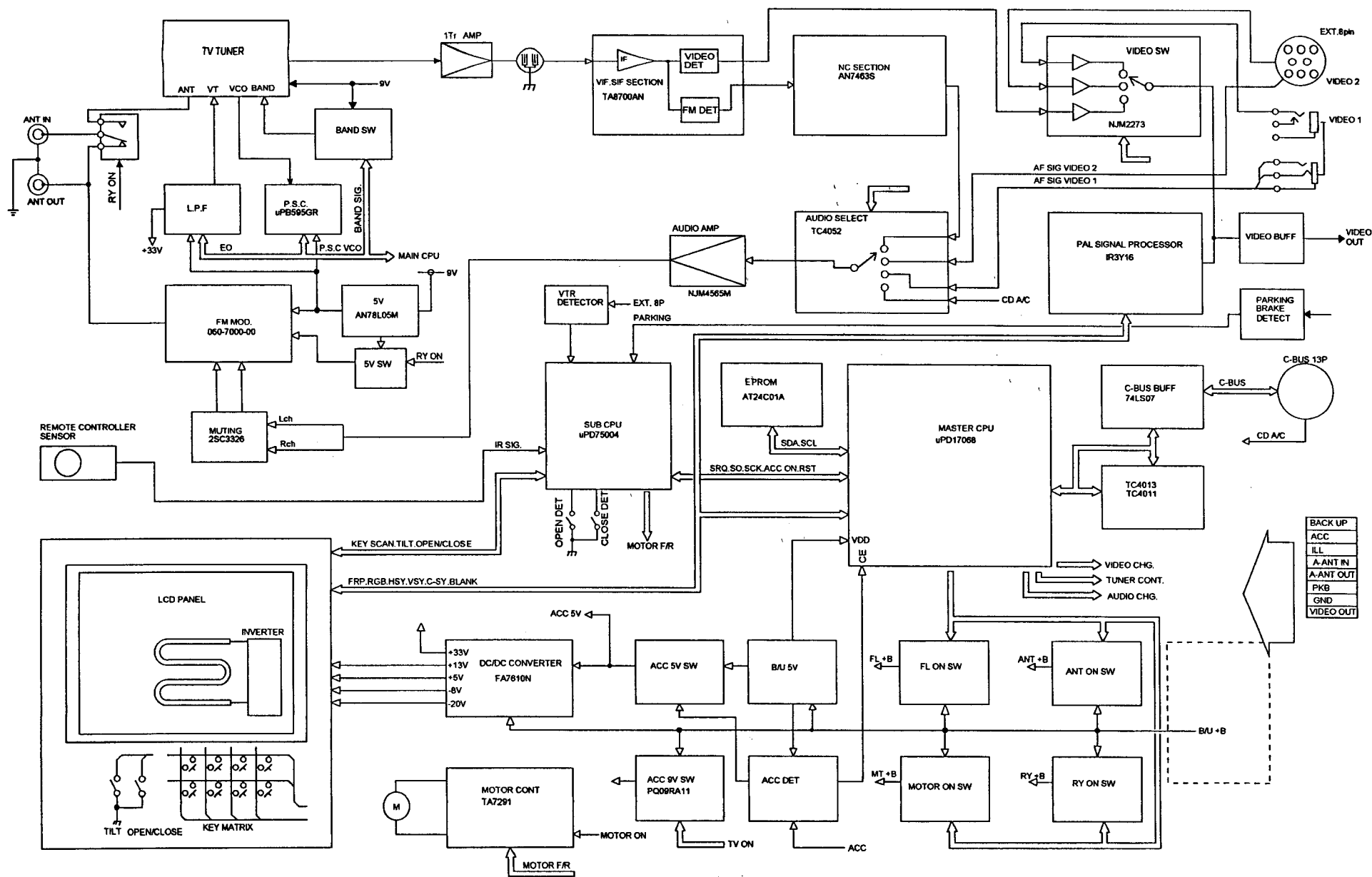
2. Use the UP/DOWN buttons to display the country to be received.

Display		
1 SINGAPORE	17 AUSTRIA	33 BAHRAIN
2 INDONESIA	18 NETHERLAND	34 JORDAN
3 THAILAND	19 SWISS	35 ALGERIA
4 MALAYSIA	20 SPAIN	36 UGANDA
5 SRILANKA	21 GERMANY	37 GHANA
6 PAKISTAN	22 BELGIUM	38 ZAMBIA
7 MOLVIDES	23 PORTUGAL	39 NIGERIA
8 INDIA	24 AFGHANISTAN	40 LIBERIA
9 BOSNIA I.H.	25 U.A.RAB E.	41 SIERRA LEONE
10 SLOVENIJA	26 YEMEN	42 KENYA
11 MAKEDONIJA	27 ISRAEL	43 SUDAN
12 ICELAND	28 OMAN	44 ITALY
13 SWEDEN	29 QATAR	45 ALBANIA
14 DENMARK	30 CYPRUS	46 NEW ZEALAND
15 NORWAY	31 KUWAIT	
16 FINLAND	32 TURKEY	

3. Press the DISP/SCAN button.

The reception mode for the selected country is set the previous screen reappears.

TVX4 151



EXPLANATION OF IC

■ μ PD75004GB-F90-3B4 052-6009-10 1 DIN TV controller (slave microcomputer)

Outward Form

44-pin plastic QFP

Terminal Description

Pin No.	Symbol	I/O	Function
1	BEEP	I	BEEP ENABLE input terminal (H : ENABLE)
2	PKB	I	Parking brake input terminal (L : PKB OFF)
3	OPEN	I	Emission limit detection SW input terminal (L : SW ON emission end)
4	KI 3	I	Key scan input terminal
5	5		
7	KI 0		
8	NC	-	Not used
9	VTR ON	I	VTR connection input terminal (H : VTR connection ON)
10	SEL 2	-	Not used (GND connection)
11	SEL 1		
12	NC	-	Not in use
13			
14	KO2	O	Key scan output terminal
15	5		
16	KO0		
17	GND	-	GND terminal
18	XT 1	-	Crystal connection terminal for slave microcomputer clock signal generation
19	XT 2		
20	RESET	I	RESET input terminal
21	X 1	-	Crystal connection terminal for main microcomputer clock signal generation
22	X 2		
23	NC	-	Not used
24	MOTOR R	O	MOTOR R output terminal
25	MOTOR F	O	MOTOR F output terminal
26	MOTOR ON	O	MOTOR power supply output terminal
27	NC	-	Not used
28	DSR	O	DATA SET READY output terminal
29	NC	-	Not used
30	SO	O	Serial data output terminal
31	SCK	I	Serial clock input terminal
32	SPEED	I	Speed pulse input terminal
33	ACC ON	I	ACC ON detection input terminal (H : ACC ON)
34	NC	-	Not used
35	TILT SW	I	Tilt detection SW input terminal (H : horizontal, L : lean)
36	OP/CL SW	I	OPEN/CLOSE key input terminal (SW ON in fall)
37	REM0CON	I	Remote control input terminal
38	NC	-	Not used
39	VDD	-	+5V power supply voltage terminal
40	NC	-	Not used
42			
43	BUZ	O	BEEP tone output terminal
44	CLOSE detection	I	Storage limit detection SW input terminal (L : SW ON storage end)

Key Matrix Table

KEY IN	KEY OUT	KI 0 (7pin)	KI 1 (8pin)	KI 2 (9pin)	KI 3 (10pin)
KO 0 (16pin)	MEMO CALL RPT	DISP SCN	DOWN	SKIP RDM	
KO 1 (15pin)	UP	PCH DISC AS	FUNC	—	
KO 2 (14pin)	—	—	—	—	

■ μ PD17068GF-E22-3BA 052-6008-10 1 DIN TV controller (master microcomputer)

Outward Form

100-pin plastic QFP

Terminal Description

Pin No.	Symbol	I/O	Function				
1	NC	–	Not used				
2	FF reset	O	C-BUS FF reset				
3	FF set	O	C-BUS FF set				
4	INTO	–	Connect to GND				
5	NC	–	Not used				
6	TEST PIN	I	When +B is reset, EEPROM initialize detection terminal				
7	NC	–	Not used				
8							
9							
10	CBS srq	I	SRQ input terminal of C-BUS				
11	NC	–	Not used				
12							
13	UB HB LB	O	Switching output of TV tuner frequency band	LB	HB	UB	BAND
14				H	H	L	UHF
15				H	L	H	VHF-H
16				L	H	H	VHF-L
17	NC	–	Not used				
19	CBS CONT	O	C-BUS ACC CONT				
20	NC	–	Not used				
21	BEEP en	O	BEEP sound, allowable				
22	NC	–	Not used				
23							
24	CBS si	I	Data input terminal of C-BUS				
25	CBS so	O	Data output terminal of C-BUS				
26	CBS sck	O	Clock terminal of C-BUS				
27	NC	–	Not used				
28	GND		GND terminal				
29	OSC out						
30	OSC in						
31	OSD r	O	Character signal output terminal Character data output terminal for R, G, B, BLANK				
32	OSD g						
33	OSD b						
34	OSD blk						
35							
33	NC	–	Not used				
36	HSYNC	I	Horizontal synchronizing signal input terminal				
37	NC	–	Not used				
38	VSYNC	I	Vertical synchronizing signal input terminal				
39	C sync	I	Input terminal of horizontal synchronizing signal counter				
40	NC	–	Not used				
41							
42	DSR	I	DSR input from slave microcomputer				
43	NC	–	Not used				
44							
45	SLV si	I	Serial data input from slave microcomputer				
46	CLAMP	O	Constant switching circuit control output for clamping (H for TV)				
47	SLV sck	O	Serial clock signal output to slave microcomputer				
48	NC	–	Not used				
49	EEP scl	O	EEPROM CLK				
50	EEP sda	I/O	EEPROM DATA				

Pin No.	Symbol	I/O	Function															
51	A chg2	O	Switching of voice output															
52	A chg1																	
			<table><tr><th>Voice output</th><th>CD</th><th>VTR 2</th><th>VTR 1</th><th>TV</th></tr><tr><td>52 pin</td><td>L</td><td>L</td><td>H</td><td>H</td></tr><tr><td>51 pin</td><td>L</td><td>H</td><td>L</td><td>H</td></tr></table>	Voice output	CD	VTR 2	VTR 1	TV	52 pin	L	L	H	H	51 pin	L	H	L	H
Voice output	CD	VTR 2	VTR 1	TV														
52 pin	L	L	H	H														
51 pin	L	H	L	H														
53	M-ANT	O	Motor antenna ON															
54	MPU reset	O	Reset port control output of slave microcomputer															
55	NC	-	Not used															
56	RY on	O	Antenna switching relay ON															
57 58 59	NC	-	Not used															
60	COL	O	PWM output for color density adjustment															
61	NC	-	Not used															
62	BRT	O	PWM output for brightness adjustment															
63	NC	-	Not used															
64	ACC on	O	ACC ON output to slave microcomputer															
65 66 67	NC	-	Not used															
68	V chg2	O	Switching of image source															
70	V chg1																	
			<table><tr><th>Image output</th><th>CD</th><th>VTR 2</th><th>VTR 1</th><th>TV</th></tr><tr><td>70 pin</td><td>L</td><td>L</td><td>H</td><td>H</td></tr><tr><td>68 pin</td><td>L</td><td>H</td><td>L</td><td>H</td></tr></table>	Image output	CD	VTR 2	VTR 1	TV	70 pin	L	L	H	H	68 pin	L	H	L	H
Image output	CD	VTR 2	VTR 1	TV														
70 pin	L	L	H	H														
68 pin	L	H	L	H														

Pin No.	Symbol	I/O	Function
69 70 71 72 73	NC	-	Not used
74	A mute	O	Sound mute
75	V mute	O	Image mute
76	NC	-	Not used
77	FL on	O	LCD back light ON
78	TV on	O	TV tuner ON
79 80 81 82	SEL 4 SEL 3 SEL 2 SEL 1	I	Specification setting port (set to L) Priority of last selection=L / Automatic return=H Blue back=L / Black back=H
83	INT 1	-	Connection to VDD
84 85	X out X in	-	Crystal connection terminal for main clock signal
86	VDD 0	-	+5V power voltage terminal
87	VDD 1	-	
88 89 90 91 92 93	NC	-	Not used
94	GND 1	-	GND terminal
95	GND 2	-	
96	VCO	I	PLL VCO input
97	EO	O	PLL error output
98	PSC	O	PLL prescaler control output
99	ACC in	I	Input terminal of ACC ON/OFF
100	NC	-	Not used

■ ADJUSTMENT

1. Adjustment of screen horizontal position

Adjust the H-POS control before assembly of the LCD panel.

Set the LCD panel on the fixture and display the monoscope pattern. Adjust the H-POS control so that the image is centered.

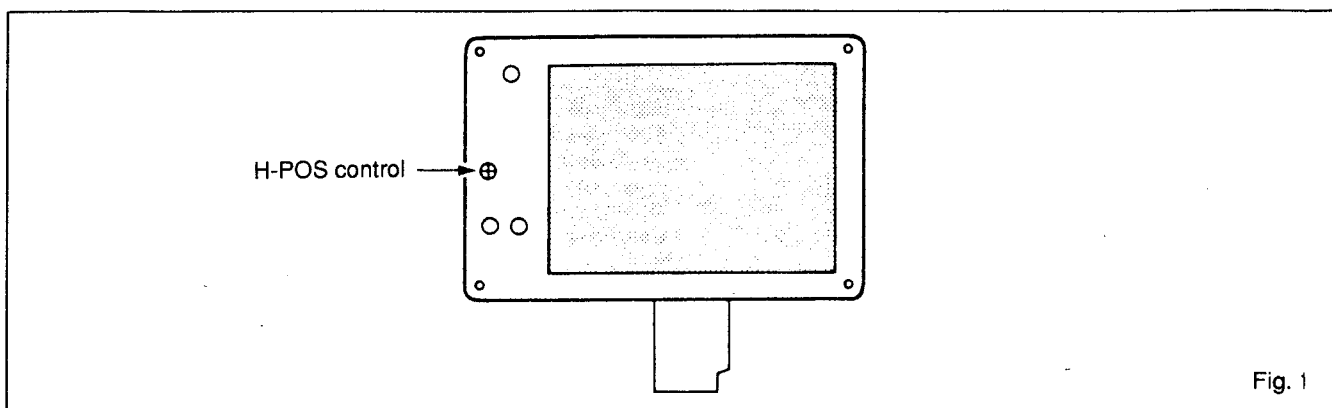


Fig. 1

2. Adjustment of DC-DC converter

1) Measurement of oscillation frequency

Measure the oscillation frequency of No. 4 pin of IC802 (FA7610N) at test point F. TP.

Check that the oscillation frequency is within $100\text{ KHz} \pm 15\text{ KHz}$.

2) Adjustment of output voltage (VR802)

Connect the DC voltmeter to test point 5V. TP.

Adjust the VR 802 so that the voltage is $+5\text{V} \pm 0.1\text{V}$.

3) Output voltage of DC-DC converter

Check that the voltage at each point is as follows.

J851 (FPC connector)	No. 18 pin	$+14\text{V} \pm 0.5\text{V}$
	No. 19 pin	$-20\text{V} \pm 1.0\text{V}$
	No. 25 pin	$-8\text{V} \pm 0.5\text{V}$
+ terminal on C111 (35V-22)		$+34\text{V} \pm 1.0\text{V}$

3. Adjustment of equipment for tuner/IF

1) Voltage at tuner pack terminal

Check the voltage at the power terminal of the tuner pack for each band.

Terminal/band	UHF	VHF-H	VHF-L
MB (#7 pin)	8.3~9.3V	←	←
LB (#6 pin)	*0.7V	*3.7V	8.3~9.3V
HB (#5 pin)	0V	8.3~9.3V	0V
UB (#4 pin)	8.3~9.3V	0V	0V

* The voltage is not externally applied. The status is open circuit.

2) Adjustment of LLD coil (IFT203) and measurement of image frequency specification and output level

(1) Prepare and connect the measuring instrument as shown in Fig. 3.

(2) Disconnect the tuner pack output from the IF input with the test pattern.

(3) TV SG setting

Frequency : P:38.9MHz S:33.4MHz (invert mode)

Output level : 85dBμ

Image signal : Multi-burst and split color bar signal

Voice modulation : 1KHz 30% (15KHz•Dev) MONO

(4) Check the wave form in multi-burst signal as shown below with the oscilloscope.

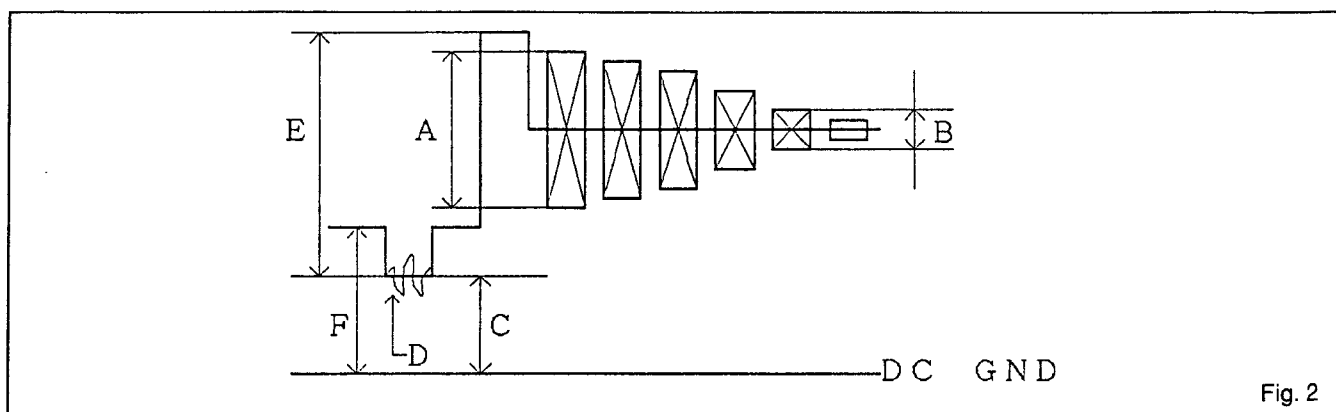


Fig. 2

- (5) Adjust the externally applied IF-AGC voltage to maintain voltage E in the figure at 1.5V.
- (6) Adjust the IFT 203 so that DC potential at C or F in the figure is minimum level.
If the wave form is disturbed due to low voltage at C, repeat adjustment in (5) and adjust the IFT203.
- (7) Check that there is no noise at H-SYNC (D).
- (8) Check that the ratio of 4.43 MHz (B) and 500 KHz (A) is in the following range. (measurement of frequency specification)
 $0.5/4.43\text{MHz} \dots -10 \pm 4\text{dB}$
 (Acceptable if A:B = 5:1 or more.)
- (9) Check that the image output is $1\text{V} \pm 0.2\text{Vp-p}$ for the split color bar signal.

Measuring point : No.10 pin of J801 at the power source

Measuring conditions : $75\ \Omega$ at termination

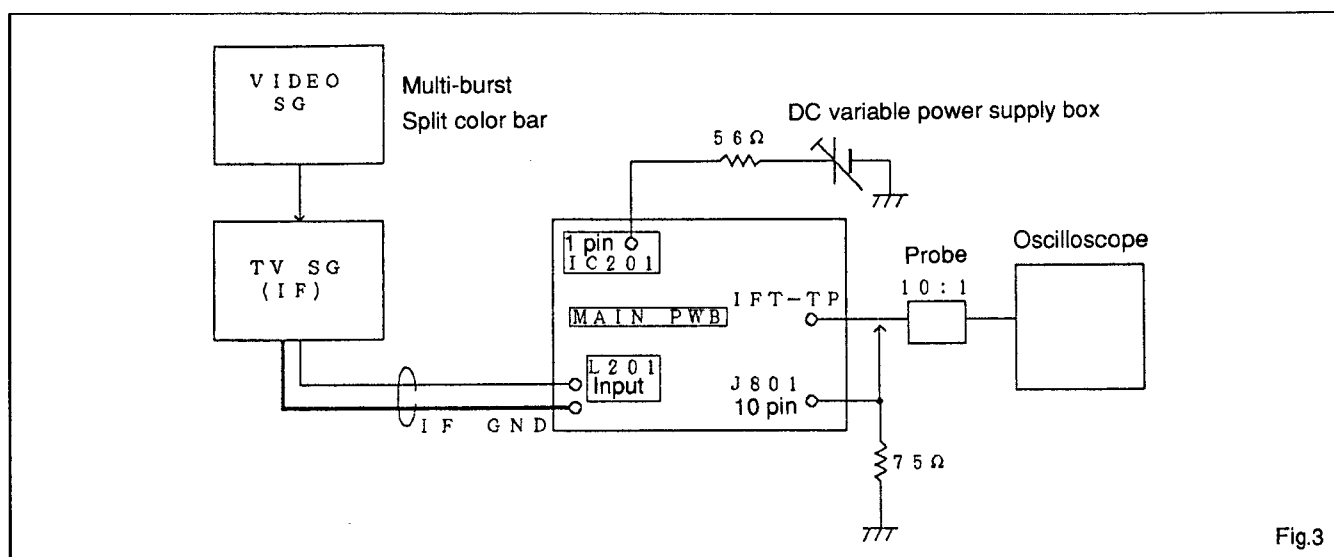


Fig.3

3) Adjustment of RF-AGC

- (1) Prepare and connect the measuring instrument as shown in Fig. 4.
- (2) Connect the tuner pack output to the IF input with the test pattern.
- (3) TV SG setting

9 ch output level : $85\text{dB}\mu$

Image signal : Multi-burst signal

Voice modulation : $1\text{KHz } 30\% (15\text{KHz} \cdot \text{Dev}) \text{ MONO}$

- (4) Adjust the AGC. VR (VR201) so that the spectrum analyzer indication level is $87\text{ dB}\mu$.

* For your information, set values of the spectrum analyzer are shown below. (Use the FET probe for measurement.)

RES-BW : 300KHz

V-BW : 300KHz

$f_0 = 38.9\text{MHz}$

$f \text{ span} = 10\text{MHz}$

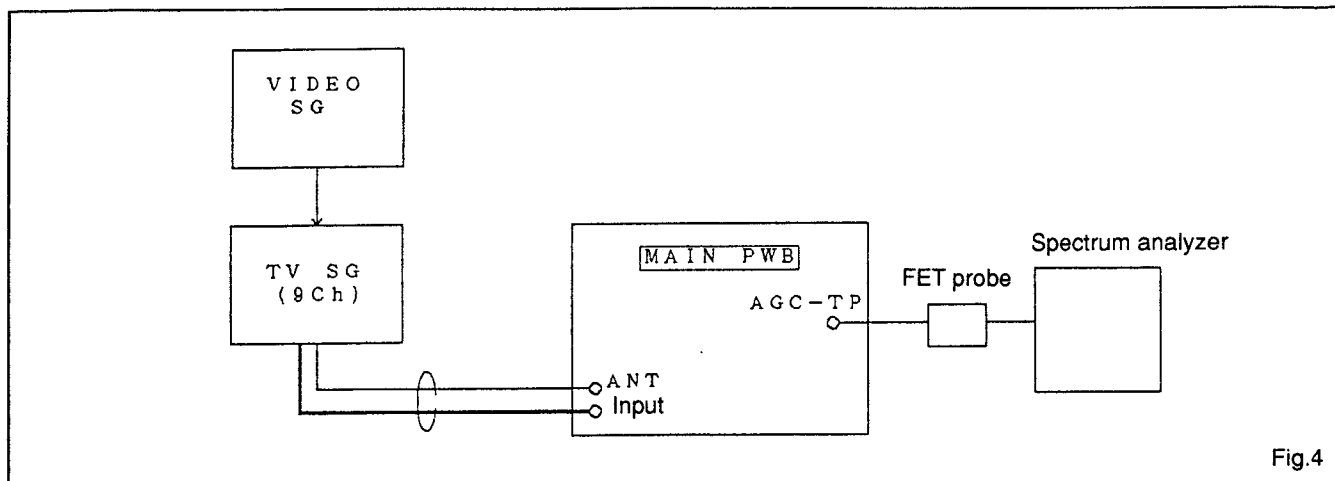


Fig.4

4. Adjustment of voice

1) Adjustment of soft mute

(1) Prepare and connect the measuring instrument as shown in Fig. 5.

(2) TV SG setting

9 ch output level : 65dB μ

Image signal : Split color bar signal

Voice modulation : 1KHz 30% (15KHz•Dev) MONO

(3) Receive the TV voice on the FM radio (88.3 MHz or 88.7 MHz). Adjust the sound volume so that it may not clip. Use this point as the 0 dB reference point.

(4) When the RF input is 12 dB μ , adjust the VR202 so that the voice output level is lowered by 10 dB.

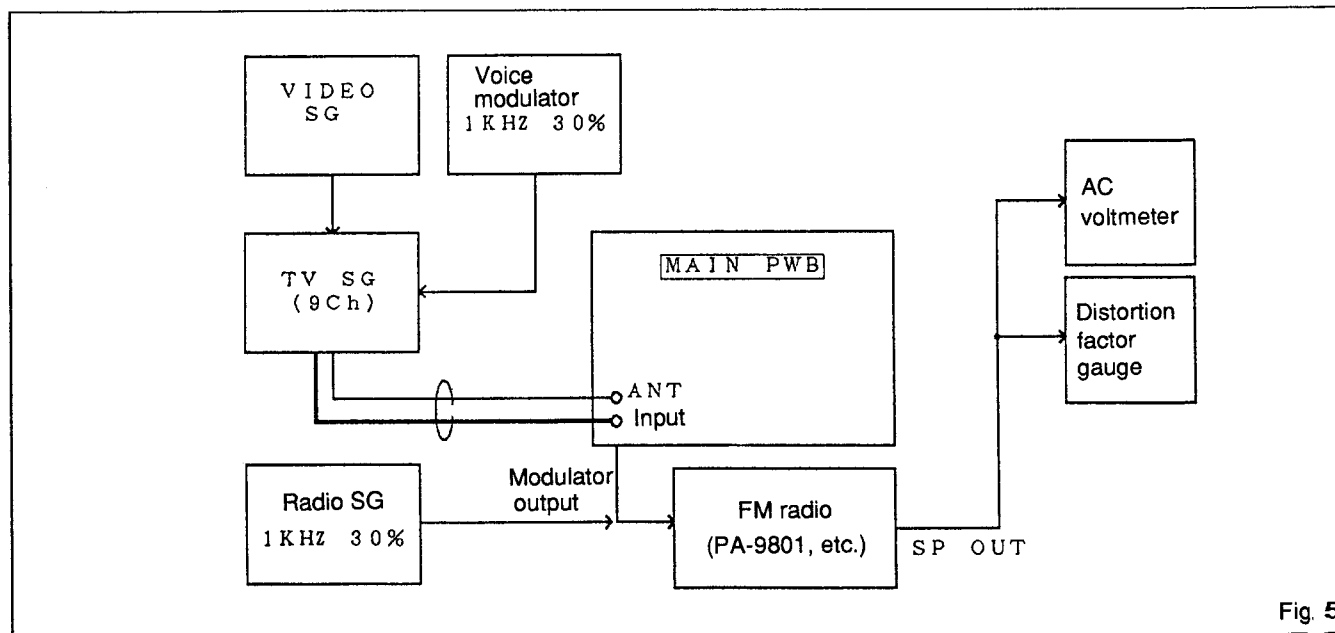


Fig. 5

2) Adjustment of voice output and measurement of voice frequency specification and distortion factor

(1) Prepare and connect the measuring instrument as shown in Fig. 5.

(2) TV SG setting

9 ch output level : 65dB μ

Image signal : Split color bar signal

Voice modulation : 1KHz 30% (15KHz•Dev) MONO

(3) Radio SG setting

RF frequency : 88.3 MHz or 88.7 MHz

RF output : 65dB μ

Voice modulation : 1KHz 30% (22.5KHz•Dev) MONO

- (4) Adjust the VR 601 (L) and VR602 (R) so that both L and R TV voice outputs are $+1 \text{ dB} \pm 2 \text{ dB}$ to radio voice outputs.
- (5) Check that the voice frequency specification and distortion factor meet the following values.
- | | |
|-------------------------|-----------------------------|
| Frequency specification | 70Hz $-2 \pm 3 \text{ dB}$ |
| | 1 KHz 0 dB (standard) |
| | 7KHz $-14 \pm 4 \text{ dB}$ |
- Distortion factor : 6% or less (20 KHz, LPF or DIN-AUDIO is used.)

5. Adjustment of OSD indication position

- 1) Adjust the OSD with the trimmer capacitor (TC 501).
- (1) Prepare and connect the measuring instrument as shown in Fig. 5.
- (2) TV SG setting
- | | |
|-------------------|-----------------------------|
| 9 ch output level | : 65dB μ |
| Image signal | : Split color bar signal |
| Voice modulation | : 1KHz 30% (15KHz•Dev) MONO |
- (3) Adjust the TC 501 so that receive channel is indicated in the center of blue bar in the split color bar as shown in Fig. 6.

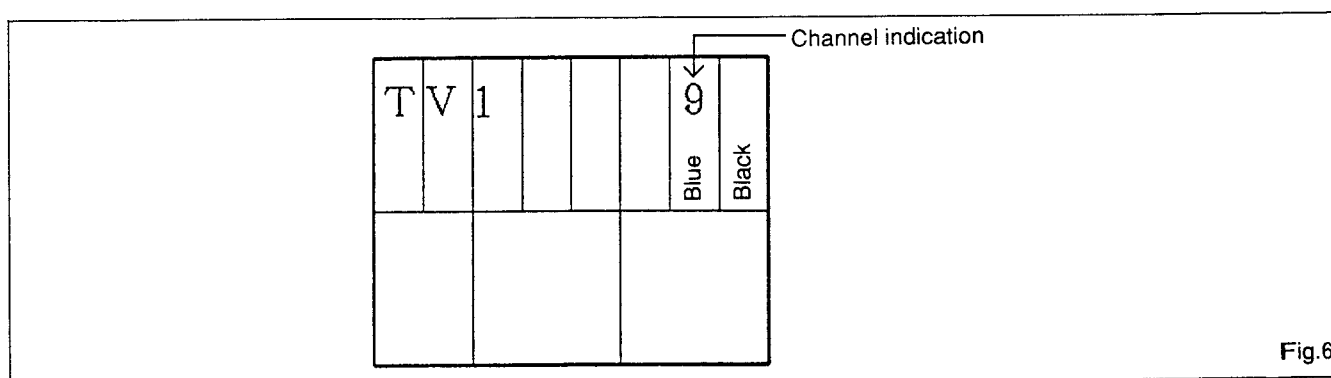


Fig. 6

6. Adjustment of signal processor

- 1) Adjustment of gamma 1, gamma 2, contrast and peak limiter
- (1) Input the image signal (10 step staircase, APL=50%) into the external video input terminal.
- (2) Connect the oscilloscope to test point G. OUT and check the wave form as shown below.

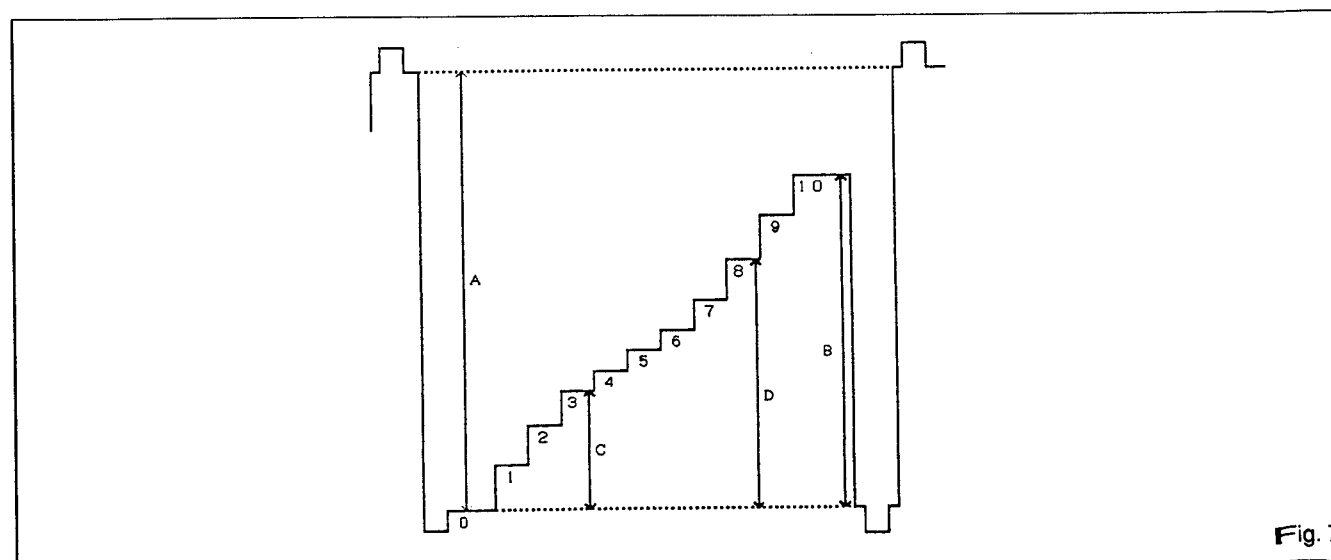


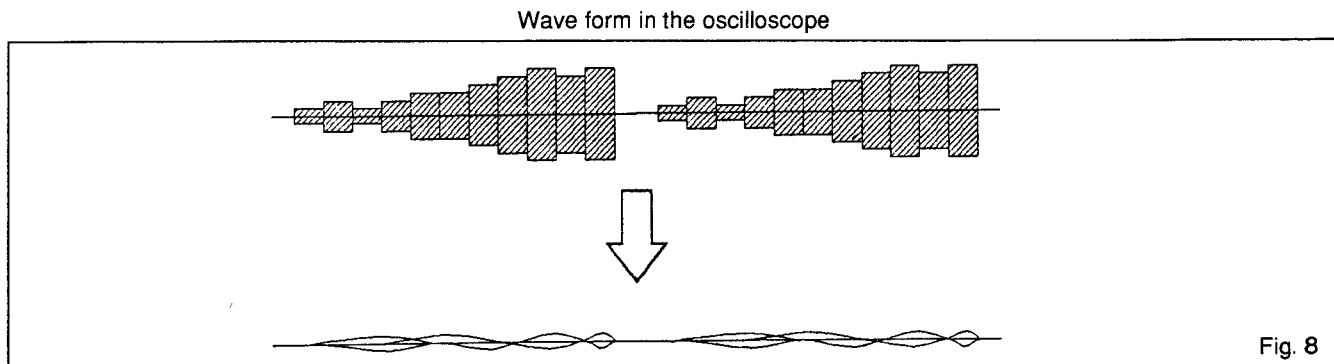
Fig. 7

- (3) Adjust brightness (with UP or DOWN button) so that black - black level in Fig. 7 is 6V.
- (4) Adjust the contrast VR (VR 408) so that voltage B at the 10th step of 10 step staircase is 4V.
- (5) Adjust the gamma 1 VR (VR 404) so that voltage C at the 3rd step is 2V.
- (6) Check that voltage B is 4V and that voltage C is 2V.

- (7) Set the APL of input image signal to 10%.
- (8) Adjust the peak limiter VR (VR 405) so that voltage B is 5.4V.
- (9) Adjust the gamma 1 VR (VR 404) so that voltage C is 2.4V.
- (10) Adjust the gamma 2 VR (VR 403) so that voltage D at the 8th step is 4.6V.
- (11) Check that voltage B is 5.4V, that voltage C is 2.4V and that voltage D is 4.6V.

2) Adjustment of white balance

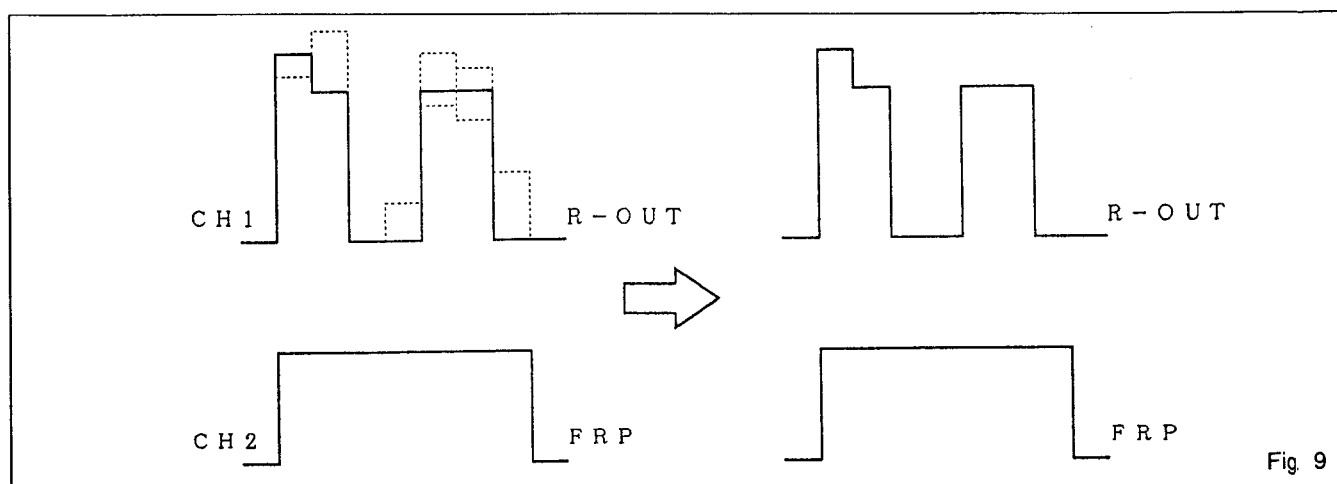
- (1) Input the image signal (10 step staircase, APL=50%) into the external video input terminal.
- (2) Using 2-phenomena oscilloscope, check wave forms at test points G. OUT and R. OUT simultaneously.
(Check G. OUT in CH-1 and R. OUT in CH-2. Invert the CH-2 with the invert switch on the oscilloscope and check the wave form in ADD-mode.)



- (3) Adjust the sub-bright R-VR (VR 402) and the sub-contrast R-VR (VR 407) so that the wave form is linear as shown above.
- (4) Check the wave form at test point B. OUT in CH-2 and the wave form at test point G. OUT in CH-1 simultaneously. Adjust the sub-bright B-VR (VR 401) and the sub-contrast B-VR (VR 406) so that the wave form is linear as shown above.

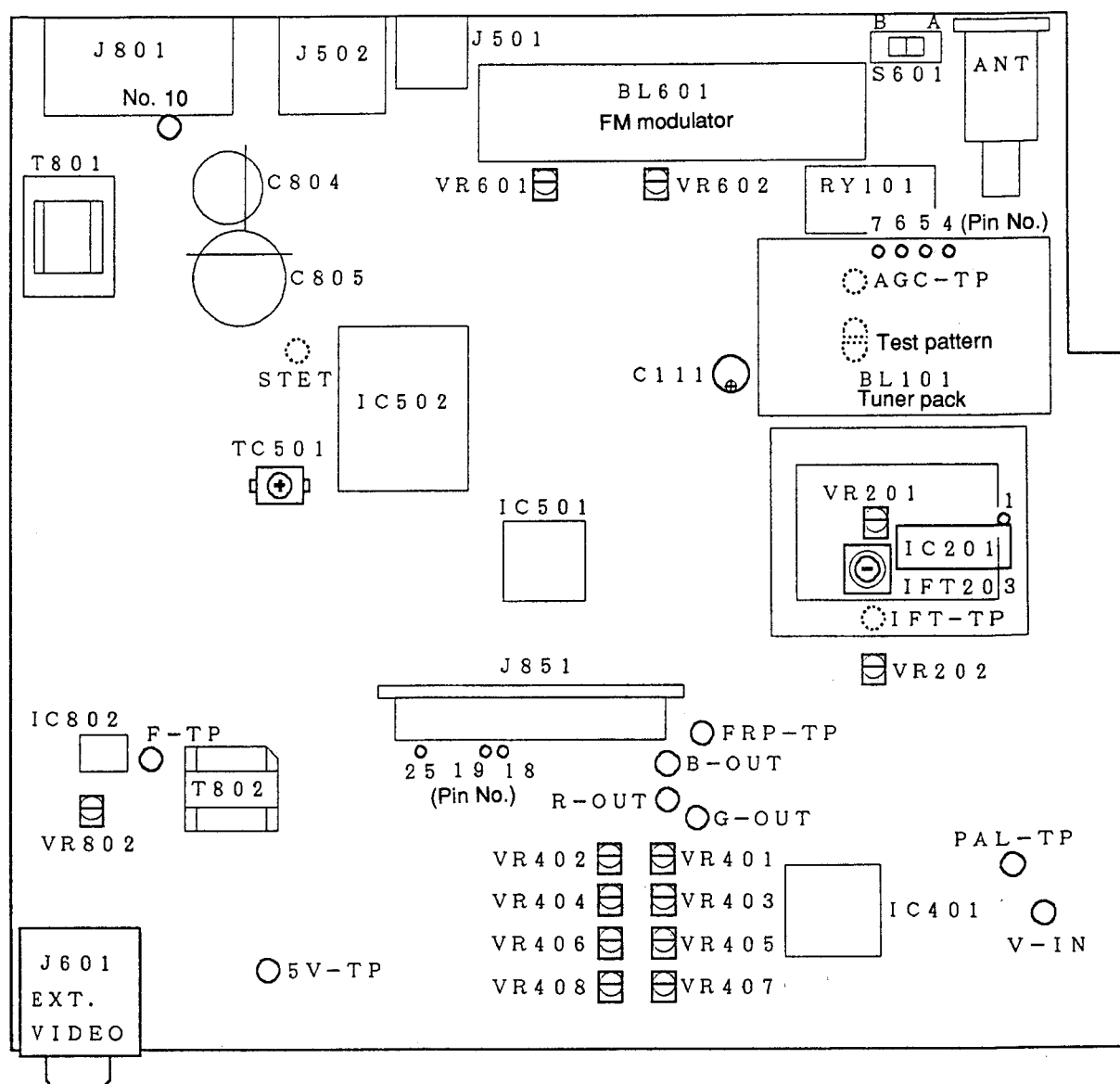
3) Adjustment of burst cleaning coil

- (1) Input the image signal (standard color bar signal) into the external video input terminal.
- (2) Check test point R. OUT and test point FRP simultaneously with the oscilloscope.
- (3) Apply trigger to FRP to check the wave form shown below.



- (4) Turn and adjust the burst cleaning coil (L 404) so that the wave form deviation of R. OUT is minimized.

Test Point



*AGC-TP, test pattern and IFT-TP in the figure are present on the soldering surface.

PARTS LIST

MAIN PWB

REF No.	PART No.	DESSCRPTION	REF No.	PART No.	DESSCRPTION	REF No.	PART No.	DESSCRPTION
BL 601	060-7000-00	RF MODULATOR	C 403	183-1063-31	16V10uF	C 601	176-5091-00	5pF CH
C 101	178-1032-78	0.01uF	C 404	178-1032-78	0.01uF	C 602	178-1042-78	0.1uF
C 102	178-1032-78	0.01uF	C 405	178-1032-78	0.01uF	C 603	178-1032-78	0.01uF
C 103	178-1032-78	0.01uF	C 406	178-1032-78	0.01uF	C 604	183-1063-31	16V10uF
C 105	178-1032-78	0.01uF	C 407	178-1032-78	0.01uF	C 605	183-1063-31	16V10uF
C 106	178-1032-78	0.01uF	C 408	178-1032-78	0.01uF	C 606	178-2222-78	2200pF
C 107	183-4763-31	16V47uF	C 409	178-1032-78	0.01uF	C 607	183-1063-31	16V10uF
C 108	172-4741-11	0.47uF	C 410	178-1032-78	0.01uF	C 608	178-2222-78	2200pF
C 109	178-1032-78	0.01uF	C 411	183-1073-21	10V100uF	C 609	178-2232-78	0.022uF
C 110	178-3312-78	330pF	C 412	178-1032-78	0.01uF	C 701	183-1063-31	16V10uF
C 111	183-2263-52	35V 22uF	C 413	183-1073-21	10V100uF	C 702	183-1063-31	16V10uF
C 112	178-1022-78	1000pF	C 414	183-4743-61	50V0.47uF	C 703	183-1063-31	16V10uF
C 113	178-1032-78	0.01uF	C 415	178-1032-78	0.01uF	C 704	183-1063-31	16V10uF
C 114	178-1042-78	0.1uF	C 416	178-1032-78	0.01uF	C 705	183-1063-31	16V10uF
C 115	178-1022-78	1000pF	C 417	178-4732-78	0.047uF	C 706	183-4763-31	16V47uF
C 116	176-1007-00	10pF CH	C 418	178-1032-78	0.01uF	C 707	183-1063-31	16V10uF
C 117	178-1032-78	0.01uF	C 419	178-1032-78	0.01uF	C 708	178-1542-78	0.15uF
C 118	178-1022-78	1000pF	C 420	176-1511-00	150pF	C 709	178-1542-78	0.15uF
C 201	176-1007-00	10pF CH	C 422	176-1201-00	12pF CH	C 710	176-1811-00	180pF CH
C 202	178-1032-78	0.01uF	C 423	178-1032-78	0.01uF	C 711	176-1811-00	180pF CH
C 203	178-1032-78	0.01uF	C 424	183-1053-61	50V1uF	C 801	183-4753-51	35V4.7uF
C 204	183-4753-51	35V4.7uF	C 425	178-1532-78	0.015uF	C 802	183-4763-31	16V47uF
C 205	178-1032-78	0.01uF	C 426	176-5601-00	56pF CH	C 803	183-1063-51	35V10uF
C 206	182-1073-33	16V 100uF	C 427	178-2222-78	2200pF	C 804	184-1083-32	16V1000uF
C 207	178-1032-78	0.01uF	C 428	178-1032-78	0.01uF	C 805	184-4783-12	6.3V 4700uF
C 208	178-1032-78	0.01uF	C 429	178-1032-78	0.01uF	C 806	178-1042-78	0.1uF
C 209	178-1032-78	0.01uF	C 430	178-1032-78	0.01uF	C 807	183-1073-21	10V100uF
C 210	183-4743-61	50V0.47uF	C 431	178-1032-78	0.01uF	C 808	183-4763-31	16V47uF
C 211	178-1032-78	0.01uF	C 432	178-1032-78	0.01uF	C 809	183-4753-51	35V4.7uF
C 212	178-1032-78	0.01uF	C 433	178-6812-78	680pF	C 810	176-1021-00	1000pF CH
C 213	176-3301-00	33pF CH	C 434	183-1073-21	10V100uF	C 811	183-1073-21	10V100uF
C 214	178-1032-78	0.01uF	C 435	178-1032-78	0.01uF	C 812	178-2222-78	2200pF
C 215	183-1063-31	16V10uF	C 436	178-1042-78	0.1uF	C 813	178-3312-78	330pF
C 216	178-1032-78	0.01uF	C 437	178-1042-78	0.1uF	C 814	178-3312-78	330pF
C 217	178-2232-78	0.022uF	C 438	178-1042-78	0.1uF	C 815	184-2273-32	16V220uF
C 218	178-2232-78	0.022uF	C 439	178-1042-78	0.1uF	C 816	043-0265-01	100V 100pF
C 219	184-4773-21	10V 470uF	C 440	183-1053-61	50V1uF	C 817	042-0470-05	35V12uF
C 220	183-4753-51	35V4.7uF	C 441	178-2232-78	0.022uF	C 818	042-0478-00	6.3V220uF
C 221	178-1022-78	1000pF	C 501	183-4763-11	6.3V47uF	C 819	183-1073-12	6.3V100uF
C 222	178-1022-78	1000pF	C 502	178-2232-78	0.022uF	C 820	042-0470-05	35V12uF
C 223	176-1011-00	100pF CH	C 504	178-1032-78	0.01uF	C 821	183-1073-21	10V100uF
C 224	176-3301-00	33pF CH	C 507	178-1042-78	0.1uF	C 822	182-2263-62	50V 22uF
C 226	178-1042-78	0.1uF	C 508	178-1042-78	0.1uF	C 823	183-4763-31	16V47uF
C 227	178-4732-78	0.047uF	C 509	178-1032-78	0.01uF	C 824	176-1511-00	150pF
C 228	178-4732-78	0.047uF	C 510	183-4763-11	6.3V47uF	C 825	178-3312-78	330pF
C 229	178-1042-78	0.1uF	C 511	178-1022-78	1000pF	C 826	042-0470-05	35V12uF
C 230	178-2722-78	2700pF	C 512	178-1022-78	1000pF	C 830	183-1073-21	10V100uF
C 231	178-1032-78	0.01uF	C 513	178-1022-78	1000pF	C 851	183-4763-31	16V47uF
C 232	183-4763-31	16V47uF	C 514	176-1011-00	100pF CH	C 852	172-1041-10	0.1uF
C 233	183-4763-31	16V47uF	C 515	178-1032-78	0.01uF	D 101	001-0516-00	MA111
C 234	178-3912-78	390pF	C 516	183-4763-11	6.3V47uF	D 102	001-0516-00	MA111
C 235	178-2712-78	270pF	C 517	178-1032-78	0.01uF	D 103	001-0516-00	MA111
C 236	178-1022-78	1000pF	C 518	176-1201-00	12pF CH	D 104	001-0506-00	DAN202K
C 237	178-1022-78	1000pF	C 519	176-1201-00	12pF CH	D 105	001-0506-00	DAN202K
C 238	176-1011-00	100pF CH	C 520	178-1032-78	0.01uF	D 106	001-0506-00	DAN202K
C 239	178-2232-78	0.022uF	C 521	178-1022-78	1000pF	D 107	001-0583-13	MA8030
C 240	183-2263-31	16V22uF	C 522	178-1032-78	0.01uF	D 108	001-0516-00	MA111
C 241	183-1063-31	16V10uF	C 523	178-1042-78	0.1uF	D 201	001-0541-00	MA157
C 242	183-1063-31	16V10uF	C 524	176-3901-00	39pF CH	D 301	001-0367-00	1SS226
C 243	183-1063-31	16V10uF	C 525	176-3001-00	30pF CH	D 302	001-0367-00	1SS226
C 244	178-1032-78	0.01uF	C 529	178-1042-78	0.1uF	D 401	001-0516-00	MA111
C 245	172-2731-10	0.027uF	C 530	178-1042-78	0.1uF	D 503	001-0516-00	MA111
C 246	173-6821-11	6800pF	C 531	178-1042-78	0.1uF	D 506	001-0516-00	MA111
C 247	172-1231-11	0.012uF	C 532	184-4773-22	10V470uF	D 507	001-0583-24	MA8082
C 248	183-1063-31	16V10uF	C 533	178-1042-78	0.1uF	D 508	001-0583-24	MA8082
C 249	173-8221-11	8200pF	C 534	178-1032-78	0.01uF	D 509	001-0583-24	MA8082
C 250	178-2222-78	2200pF	C 535	178-2232-78	0.022uF	D 801	001-0466-00	S5688B
C 251	183-4753-51	35V4.7uF	C 536	178-2232-78	0.022uF	D 802	001-0466-00	S5688B
C 252	176-1011-00	100pF CH	C 537	178-1032-78	0.01uF	D 803	001-0516-00	MA111
C 301	183-1063-31	16V10uF	C 538	178-1032-78	0.01uF	D 804	001-0583-23	MA8075
C 302	183-1063-31	16V10uF	C 539	178-1032-78	0.01uF	D 805	001-0334-30	RL202
C 303	183-1063-31	16V10uF	C 540	178-1032-78	0.01uF	D 806	001-0516-00	MA111
C 304	182-1073-33	16V 100uF	C 541	178-1032-78	0.01uF	D 807	001-0516-00	MA111
C 401	183-4753-51	35V4.7uF	C 542	183-4763-31	16V47uF	D 808	001-0516-00	MA111
C 402	183-1063-31	16V10uF	C 543	178-5612-78	560pF	D 809	001-0516-00	MA111

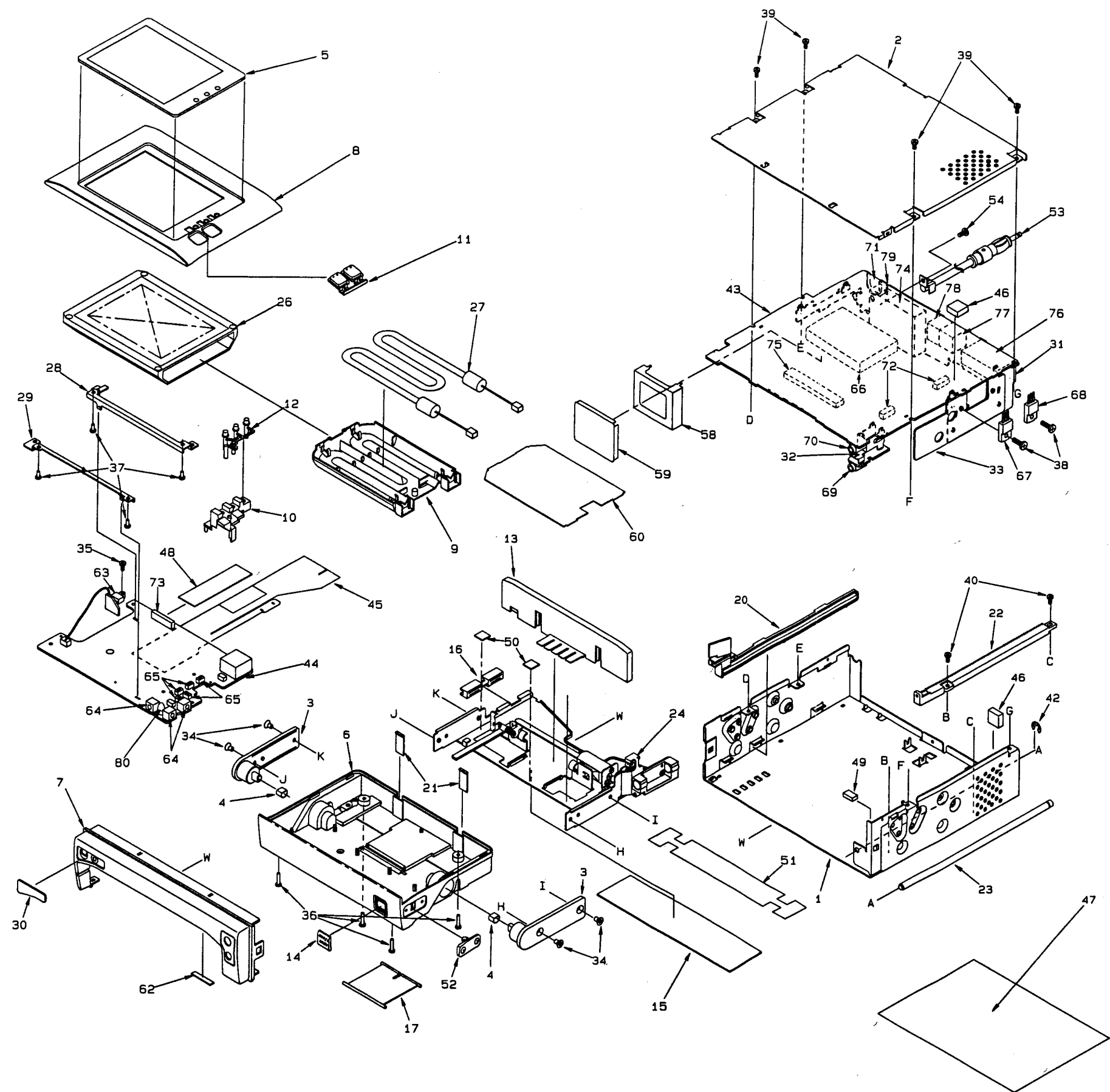
REF No.	PART No.	DESSCRPTION
D 810	001-0528-36	MA8062H
D 811	001-0464-00	1GWJ42
D 812	001-0464-00	1GWJ42
D 814	001-0330-00	1SS119
D 815	001-0376-52	MTZJ10D
D 816	001-0589-00	1SS145
D 817	001-0528-87	MA8330-M
D 818	001-0516-00	MA111
D 819	001-0330-00	1SS119
D 820	001-0516-00	MA111
D 851	001-0376-51	MTZJ10C
IC 101	051-6200-05	uPB595GR
IC 201	051-1755-10	TA8700AN
IC 202	051-0987-01	AN7463S
IC 203	051-1292-00	NJM4565M-D
IC 301	051-1754-00	NJM2273
IC 401	051-5304-00	IR3Y16
IC 501	052-6009-10	uPD75004GB-F90-3B4
IC 502	052-6008-10	uPD17068GF-E22-3BA
IC 503	051-9403-05	24C01A
IC 504	051-0173-05	TC4050BF
IC 505	051-0172-05	TC4011BF
IC 506	051-0142-05	TC4013BF
IC 507	051-7400-06	HD74LS07FP
IC 601	051-1924-00	AN78L05M
IC 701	051-0410-05	TC4052BF
IC 702	051-1292-00	NJM4565M-D
IC 801	051-1788-00	PQ09RA11
IC 802	051-1619-00	FA7610N
IC 851	051-1014-10	TA7291S
IFT 201	060-2200-00	SAF38.9MHz
IFT 202	060-2000-00	CDSH5.5MC
IFT 203	005-5005-00	
IFT 204	060-2606-00	TPS5.5MB
IFT 205	060-2606-00	TPS5.5MB
IFT 206	005-2003-00	SFSL5.5MC
IR 502	060-4001-00	RS-51
L 101	010-2330-20	10uH
L 102	010-2330-22	15uH
L 201	010-2330-00	0.22uH
L 202	010-2330-10	1.5uH
L 203	010-2198-52	3.3uH
L 204	010-2330-22	15uH
L 205	010-2330-22	15uH
L 206	010-2330-25	27uH
L 404	010-4013-00	806PN-504
L 501	010-2230-22	10uH
L 502	010-2199-24	10uH
L 503	010-2199-28	22uH
L 802	010-2271-00	100uH
L 802	010-2271-00	100uH
L 803	010-2199-36	100uH
L 804	010-2271-00	100uH
L 851	010-2271-00	100uH
L 852	010-2271-00	100uH
PRT801	051-1570-10	ICP-F15
Q 101	125-0014-01	DTA143EK
Q 102	125-0014-01	DTA143EK
Q 103	125-0014-01	DTA143EK
Q 104	100-1213-00	2SA1213
Q 105	108-0208-00	2SK208
Q 106	102-2712-00	2SC2712
Q 107	102-2712-00	2SC2712
Q 201	102-3125-00	2SC3125
Q 202	100-1162-00	2SA1162
Q 203	102-2712-00	2SC2712
Q 204	102-2712-00	2SC2712
Q 205	102-2712-00	2SC2712
Q 206	102-3326-00	2SC3326
Q 401	100-1162-00	2SA1162
Q 402	125-2020-03	DTC124EK
Q 502	125-0021-07	DTA113ZU
Q 505	125-0021-07	DTA113ZU
Q 506	125-0021-07	DTA113ZU
Q 507	100-1162-00	2SA1162

REF No.	PART No.	DESSCRPTION
Q 508	125-2020-03	DTC124EK
Q 509	102-2712-00	2SC2712
Q 510	102-2712-00	2SC2712
Q 601	100-1162-00	2SA1162
Q 602	102-3326-00	2SC3326
Q 603	102-3326-00	2SC3326
Q 801	102-2712-00	2SC2712
Q 802	125-0024-03	MUN2112
Q 803	100-1162-00	2SA1162
Q 804	125-2020-03	DTC124EK
Q 805	102-3668-00	2SC3668
Q 806	102-3668-00	2SC3668
Q 807	125-0024-03	MUN2112
Q 808	125-2020-03	DTC124EK
Q 809	100-1213-00	2SA1213
Q 810	125-2020-03	DTC124EK
Q 811	125-2020-03	DTC124EK
Q 813	100-1213-00	2SA1213
Q 814	125-2020-03	DTC124EK
Q 815	125-2020-03	DTC124EK
Q 816	103-1266-00	2SD1266
R 102	117-2221-10	1/10W 2.2kOHM
R 103	117-1031-10	1/10W 10kOHM
R 104	117-1031-10	1/10W 10kOHM
R 105	117-3921-10	1/10W 3.9kOHM
R 106	117-1021-10	1/10W 1kOHM
R 107	117-3331-10	1/10W 33kOHM
R 108	117-3331-10	1/10W 33kOHM
R 109	117-3321-10	1/10W 3.3kOHM
R 201	117-1021-10	1/10W 1kOHM
R 202	117-7521-10	1/10W 7.5kOHM
R 203	117-1521-10	1/10W 1.5kOHM
R 204	117-3311-10	1/10W 330OHM
R 205	117-3301-10	1/10W 33OHM
R 206	117-1511-10	1/10W 150OHM
R 207	117-3921-10	1/10W 3.9kOHM
R 208	117-1021-10	1/10W 1kOHM
R 209	117-5601-10	1/10W 560OHM
R 210	117-1241-10	1/10W 120kOHM
R 211	117-1811-10	1/10W 180OHM
R 212	117-1811-10	1/10W 180OHM
R 213	117-1031-10	1/10W 10kOHM
R 214	117-3311-10	1/10W 330OHM
R 215	117-3311-10	1/10W 330OHM
R 216	117-1521-10	1/10W 1.5kOHM
R 217	117-4711-10	1/10W 470OHM
R 218	117-4711-10	1/10W 470OHM
R 219	117-2231-10	1/10W 22kOHM
R 220	117-2231-10	1/10W 22kOHM
R 221	117-4721-10	1/10W 4.7kOHM
R 222	117-5611-10	1/10W 560OHM
R 223	117-3311-10	1/10W 330OHM
R 224	117-5601-10	1/10W 560OHM
R 225	117-2231-10	1/10W 22kOHM
R 226	117-4721-10	1/10W 4.7kOHM
R 227	117-1021-10	1/10W 1kOHM
R 228	117-1221-10	1/10W 1.2kOHM
R 229	117-3331-10	1/10W 33kOHM
R 230	117-1521-10	1/10W 1.5kOHM
R 231	117-8241-10	1/10W 820kOHM
R 232	117-5621-10	1/10W 5.6kOHM
R 233	117-3321-10	1/10W 3.3kOHM
R 234	117-1021-10	1/10W 1kOHM
R 235	117-4731-10	1/10W 47kOHM
R 236	117-4731-10	1/10W 47kOHM
R 237	117-1031-10	1/10W 10kOHM
R 238	117-1531-10	1/10W 15kOHM
R 239	117-1821-10	1/10W 1.8kOHM
R 240	117-4731-10	1/10W 47kOHM
R 241	117-2231-10	1/10W 22kOHM
R 242	117-1031-10	1/10W 10kOHM
R 243	117-2231-10	1/10W 22kOHM
R 244	117-1021-10	1/10W 1kOHM
R 245	117-3921-10	1/10W 3.9kOHM
R 246	117-4721-10	1/10W 4.7kOHM

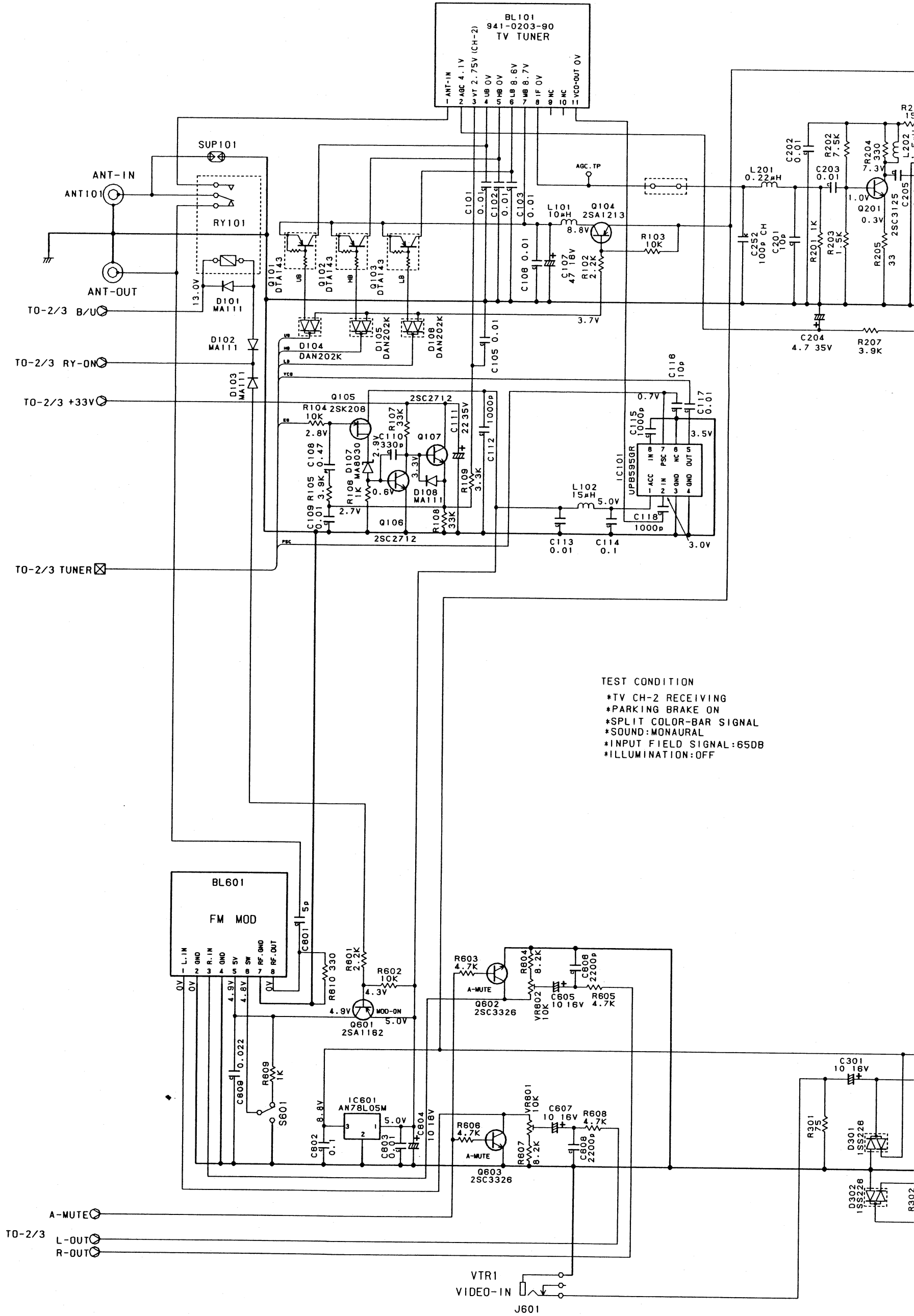
REF No.	PART No.	DESSCRPTION
R 247	117-1801-10	1/10W 180OHM
R 248	117-1811-10	1/10W 180OHM
R 249	117-1811-10	1/10W 180OHM
R 250	117-4741-10	1/10W 470kOHM
R 251	117-2221-10	1/10W 2.2kOHM
R 252	117-2221-10	1/10W 2.2kOHM
R 253	117-2221-10	1/10W 2.2kOHM
R 254	117-4721-10	1/10W 4.7kOHM
R 301	117-7501-10	1/10W 75OHM
R 302	117-7501-10	1/10W 75OHM
R 401	117-2231-10	1/10W 22kOHM
R 402	117-2231-10	1/10W 22kOHM
R 403	117-2731-10	1/10W 27kOHM
R 404	117-3331-10	1/10W 33kOHM
R 405	117-1531-10	1/10W 15kOHM
R 406	117-4731-10	1/10W 47kOHM
R 407	117-2731-10	1/10W 27kOHM
R 408	117-2731-10	1/10W 27kOHM
R 409	117-6821-10	1/10W 6.8kOHM
R 410	117-3321-10	1/10W 3.3kOHM
R 411	117-3931-10	1/10W 39kOHM
R 412	117-3931-10	1/10W 39kOHM
R 413	117-3931-10	1/10W 39kOHM
R 414	117-3931-10	1/10W 39kOHM
R 415	117-4731-10	1/10W 47kOHM
R 416	117-2731-10	1/10W 27kOHM
R 417	117-2731-10	1/10W 27kOHM
R 418	117-3931-10	1/10W 39kOHM
R 419	117-2731-10	1/10W 27kOHM
R 420	117-3931-10	1/10W 39kOHM
R 421	117-2731-10	1/10W 27kOHM
R 422	117-3931-10	1/10W 39kOHM
R 423	117-2731-10	1/10W 27kOHM
R 424	117-3931-10	1/10W 39kOHM
R 425	117-3331-10	1/10W 33kOHM
R 426	117-3331-10	1/10W 33kOHM
R 427	117-1011-10	1/10W 100OHM
R 428	117-1011-10	1/10W 100OHM
R 429	117-1011-10	1/10W 100OHM
R 430	117-6811-10	1/10W 680OHM
R 431	117-3331-10	1/10W 33kOHM
R 432	117-8221-10	1/10W 8.2kOHM
R 433	117-2731-10	1/10W 27kOHM
R 434	117-5621-10	1/10W 5.6kOHM
R 435	117-3331-10	1/10W 33kOHM
R 436	117-1021-10	1/10W 1kOHM
R 437	117-2711-10	1/10W 270OHM
R 438	117-6811-10	1/10W 680OHM
R 439	117-1521-10	1/10W 1.5kOHM
R 440	117-6211-10	1/10W 620OHM
R 441	117-3311-10	1/10W 330OHM
R 442	117-1061-10	1/10W 10MOHM
R 443	117-1051-10	1/10W 1MOHM
R 444	117-3921-10	1/10W 3.9kOHM
R 445	117-1051-10	1/10W 1MOHM
R 446	117-3341-10	1/10W 330kOHM
R 447	117-6841-10	1/10W 680kOHM
R 501	117-2221-10	1/10W 2.2kOHM
R 504	117-2231-10	1/10W 22kOHM
R 505	117-2231-10	1/10W 22kOHM
R 506	117-4731-10	1/10W 47kOHM
R 511	117-1531-10	1/10W 15kOHM
R 512	117-2231-10	1/10W 22kOHM
R 513	117-4731-10	1/10W 47kOHM
R 514	117-1021-10	1/10W 1kOHM
R 515	117-2231-10	1/10W 22kOHM
R 516	117-2231-10	1/10W 22kOHM
R 517	117-1021-10	1/10W 1kOHM
R 518	117-1021-10	1/10W 1kOHM
R 519	117-2231-10	1/10W 22kOHM
R 520	117-1021-10	1/10W 1kOHM
R 521	117-1021-10	1/10W 1kOHM
R 522	117-2231-10	1/10W 22kOHM
R 523	117-2231-10	1/10W 22kOHM
R 524	117-3311-10	1/10W 330OHM

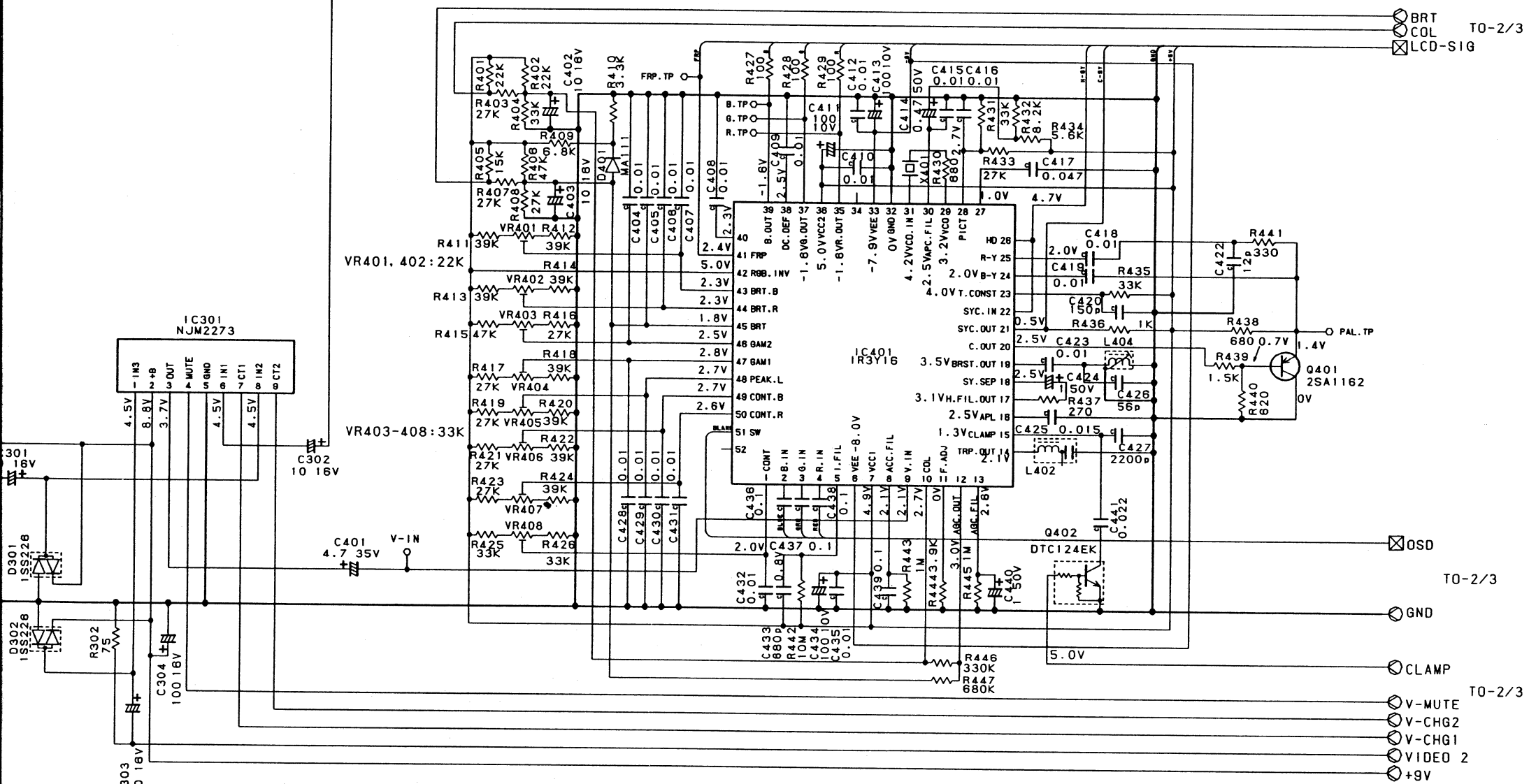
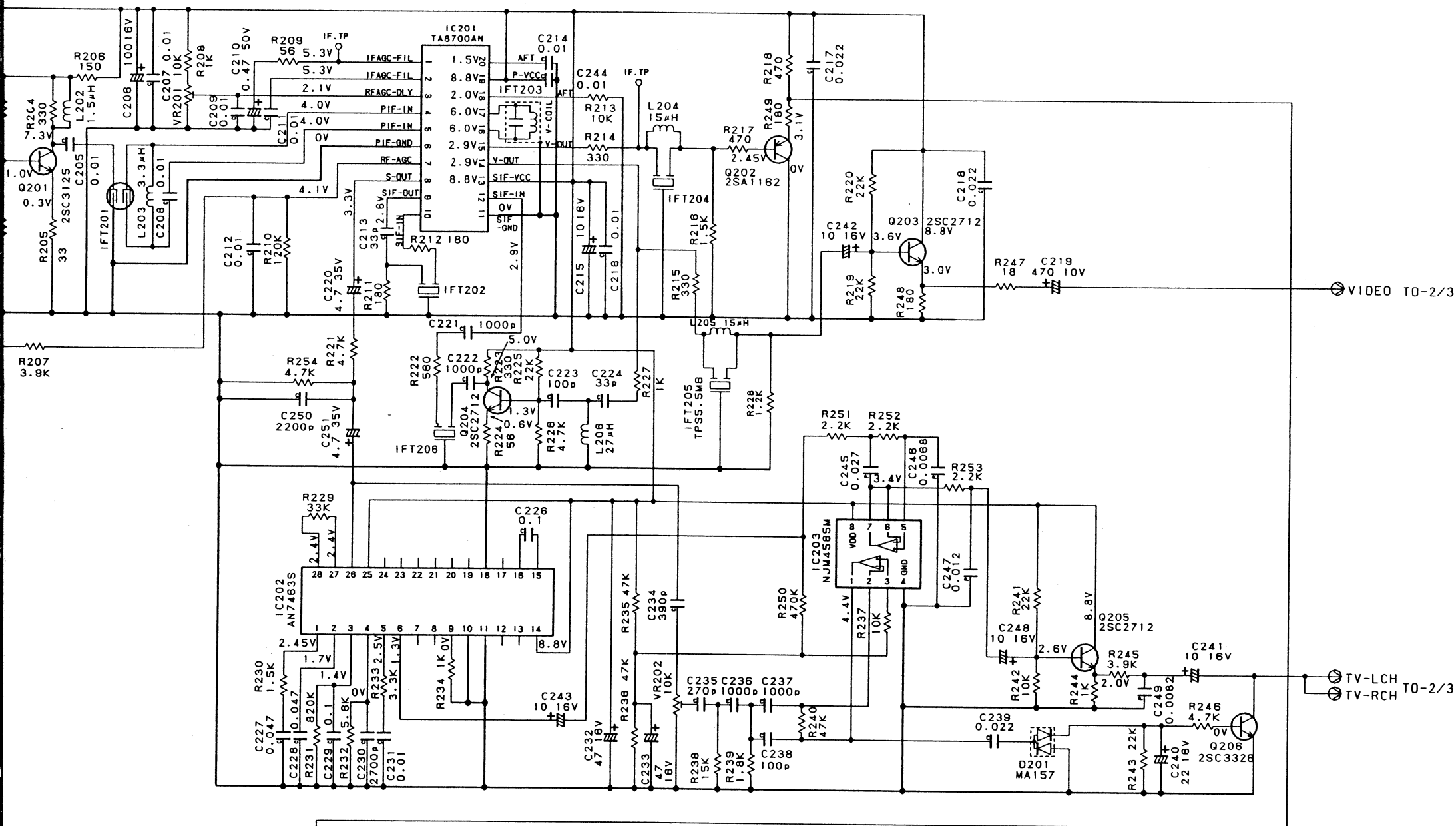
REF No.	PART No.	DESSCRPTION
R 525	117-1021-10	1/10W 1kOHM
R 526	117-1021-10	1/10W 1kOHM
R 527	117-1021-10	1/10W 1kOHM
R 528	117-1031-10	1/10W 10kOHM
R 529	117-1031-10	1/10W 10kOHM
R 530	117-2231-10	1/10W 22kOHM
R 531	117-2231-10	1/10W 22kOHM
R 532	117-1031-10	1/10W 10kOHM
R 533	117-3321-10	1/10W 3.3kOHM
R 534	117-1021-10	1/10W 1kOHM
R 535	117-1021-10	1/10W 1kOHM
R 536	117-1021-10	1/10W 1kOHM
R 537	117-1021-10	1/10W 1kOHM
R 538	117-1031-10	1/10W 10kOHM
R 539	117-2231-10	1/10W 22kOHM
R 540	117-2231-10	1/10W 22kOHM
R 541	117-1021-10	1/10W 1kOHM
R 542	117-1021-10	1/10W 1kOHM
R 543	117-1021-10	1/10W 1kOHM
R 544	117-1031-10	1/10W 10kOHM
R 545	117-1031-10	1/10W 10kOHM
R 546	117-1021-10	1/10W 1kOHM
R 547	117-1021-10	1/10W 1kOHM
R 548	117-1021-10	1/10W 1kOHM
R 549	117-1021-10	1/10W 1kOHM
R 550	117-1021-10	1/10W 1kOHM
R 551	117-1021-10	1/10W 1kOHM
R 552	117-1021-10	1/10W 1kOHM
R 553	117-1521-10	1/10W 1.5kOHM
R 554	117-1521-10	1/10W 1.5kOHM
R 555	117-1521-10	1/10W 1.5kOHM
R 556	117-2231-10	1/10W 22kOHM
R 557	117-2231-10	1/10W 22kOHM
R 558	117-4721-10	1/10W 4.7kOHM
R 559	117-4721-10	1/10W 4.7kOHM
R 560	117-4721-10	1/10W 4.7kOHM
R 561	117-4721-10	1/10W 4.7kOHM
R 562	117-1031-10	1/10W 10kOHM
R 563	117-1021-10	1/10W 1kOHM
R 601	117-2221-10	1/10W 2.2kOHM
R 602	117-1031-10	1/10W 10kOHM
R 603	117-4721-10	1/10W 4.7kOHM
R 604	117-8221-10	1/10W 8.2kOHM
R 605	117-4721-10	1/10W 4.7kOHM
R 606	117-4721-10	1/10W 4.7kOHM
R 607	117-8221-10	1/10W 8.2kOHM
R 608	117-4721-10	1/10W 4.7kOHM
R 609	117-1021-10	1/10W 1kOHM
R 610	117-3311-10	1/10W 330OHM
R 701	117-4731-10	1/10W 47kOHM
R 702	117-4731-10	1/10W 47kOHM
R 703	117-4721-10	1/10W 4.7kOHM
R 704	117-4721-10	1/10W 4.7kOHM
R 705	117-4731-10	1/10W 47kOHM
R 706	117-4731-10	1/10W 47kOHM
R 707	117-4721-10	1/10W 4.7kOHM
R 708	117-4721-10	1/10W 4.7kOHM
R 709	117-2231-10	1/10W 22kOHM
R 710	117-2231-10	1/10W 22kOHM
R 711	117-1231-10	1/10W 12kOHM
R 712	117-8221-10	1/10W 8.2kOHM
R 713	117-1831-10	1/10W 18kOHM
R 714	117-4721-10	1/10W 4.7kOHM
R 715	117-4721-10	1/10W 4.7kOHM
R 716	117-6831-10	1/10W 68kOHM
R 717	117-8221-10	1/10W 8.2kOHM
R 718	117-1231-10	1/10W 12kOHM
R 719	117-1831-10	1/10W 18kOHM
R 720	117-6831-10	1/10W 68kOHM
R 801	117-4721-10	1/10W 4.7kOHM
R 802	114-1011-11	1W 100OHM
R 803	111-1021-91	1/4WS 1kOHM
R 804	117-1521-10	1/10W 1.5kOHM
R 805	117-5621-10	1/10W 5.6kOHM
R 806	117-1031-10	1/10W 10kOHM

EXPLODED VIEW - PARTS LIST :

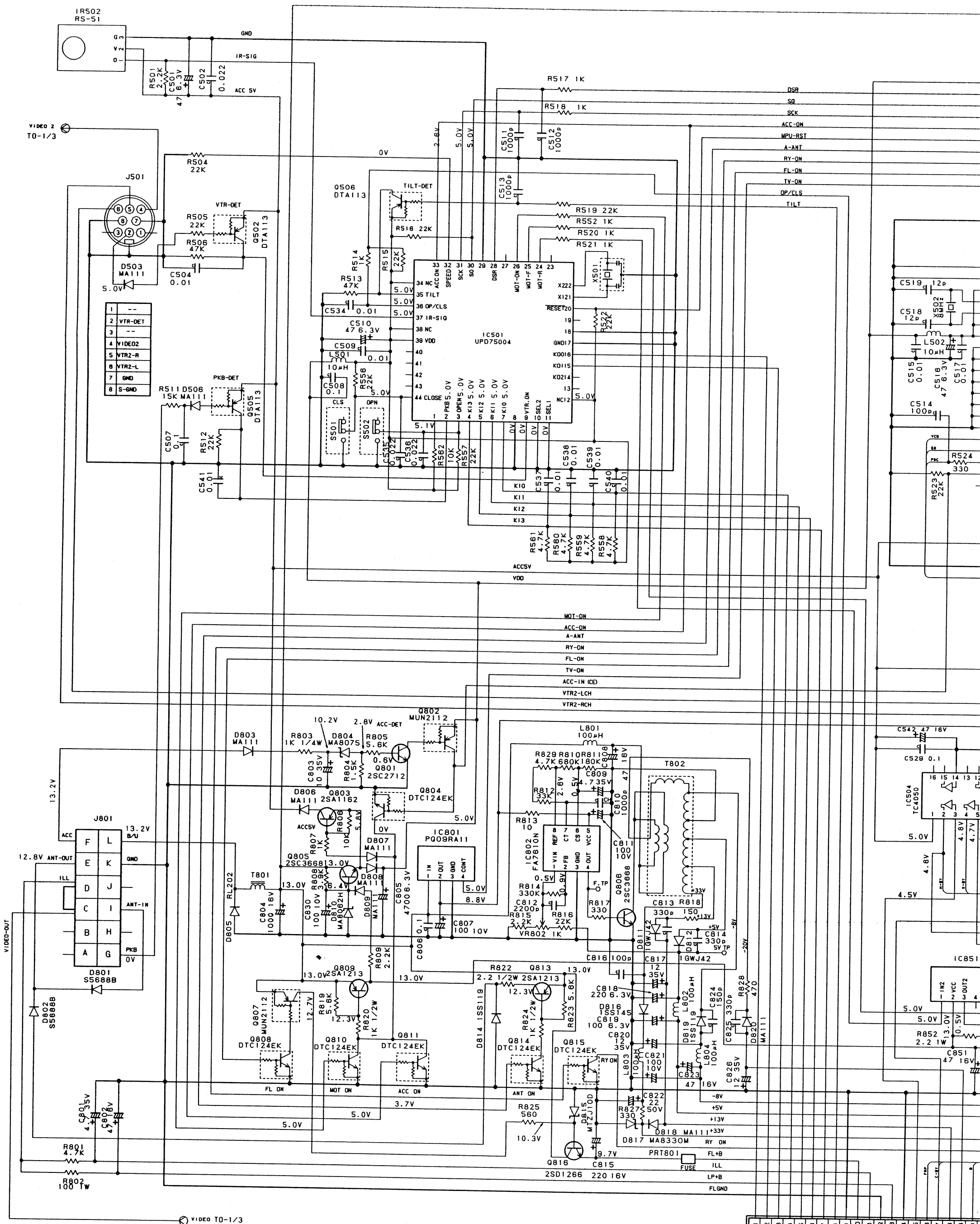


NO.	PART NO.	DESCRIPTION	QTY
1	311-1570-30	LOWER CASE	1
2	310-1515-03	UPPER CASE	1
3	947-0345-00	TORQUE BUSH	2
4	750-3053-00	D-SPRING	2
5	373-0745-40	LCD COVER	1
6	377-0198-13	DIAL SUPPORT	1
7	370-5472-40	ESCUTCHEON	1
8	373-0742-00	DIAL COVER	1
9	374-0919-00	BACK PLATE	1
10	335-4610-00	ILLUMI PLATE	1
11	382-3529-10	BUTTON A	1
12	382-3531-10	BUTTON B	1
13	335-4609-00	HOLD PLATE COVER	1
14	382-3527-00	OPEN BUTTON	1
15	347-3894-00	SHADE	1
16	335-4381-00	SLIDER	1
17	335-4608-00	FPC COVER	1
20	335-4383-01	SLIDE HOLDER	1
21	335-4384-00	LOCK	2
22	335-3854-01	RACK	1
23	612-0183-01	SHAFT	1
24	948-0319-02	HOLD PLATE ASSY	1
24-1	020-1501-01	DC-MOTOR	1
24-2	613-0309-00	WORM GEAR	1
26	379-0434-00	INDICATOR(LCD)	1
27	060-0353-00	GAS FILLED TUBE(BACK LIGHT)	1
28	331-0308-00	LCD PLATE A	1
29	331-0309-00	LCD PLATE B	1
30	373-0743-20	DIAL COVER A	1
31	331-0037-05	CONNECTOR PLATE	1
32	331-0307-00	JACK HOLDER	1
33	313-1525-00	HEAT SINK	1
34	716-1598-00	SCREW	4
35	702-2006-81	TAP SCREW	1
36	702-2010-87	TAP SCREW(M2X10)	4
37	702-2605-81	TAP SCREW(M2.6X5)	4
38	714-3010-81	MACHINE SCREW	2
39	716-0878-00	IT-SCREW	4
40	714-2605-81	MACHINE SCREW	2
42	743-4000-10	E-RING	1
43	039-0513-00	MAIN PWB	1
44	039-0082-02	SWITCH PWB	1
45	039-0066-00	FLEX PWB	1
46	345-5095-00	RUBBER SPACER	2
47	286-8417-00	SETPLATE	1
48	039-0067-00	FLEX PWB(LCD)	1
49	345-5096-00	RUBBER SPACER	1
51	353-0427-00	SHADE B	1
52	382-3528-00	UP DOWN BUTTON	1
53	855-6310-01	ANTENNA CORD	1
54	731-3006-81	TAPTIGHT	1
58	331-0042-00	SHIELD CASE	1
59	331-0041-00	SHIELD COVER	1
60	347-3895-00	SPACER PLATE	1
62	347-3309-00	INSULATOR (SHADE)	1
63	013-3974-00	SWITCH	1
64	013-3932-00	SWITCH	3
65	013-3741-11	SWITCH	5
66	941-0203-90	TUNER PACK	1
67	103-1266-00	TRANSISTOR	1
68	051-1788-00	IC	1
69	075-0339-00	JACK	1
70	075-0324-01	JACK	1
71	092-0612-03	ANTENNA RECEPTACLE	1
72	013-3880-02	SWITCH	2
73	074-1042-16	OUTLET SOCKET(16P)	1
74	060-7000-00	RF-MODULATOR	1
75	074-0731-28	OUTLET SOCKET(28P)	1
76	074-0884-00	OUTLET SOCKET(12P)	1
77	074-1022-01	OUTLET SOCKET(13P)	1
78	074-1030-00	OUTLET SOCKET(VIDEO)	1
79	013-5002-00	SWITCH	1
80	017-0422-02	PILOT LAMP	1



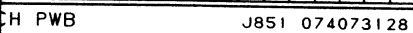


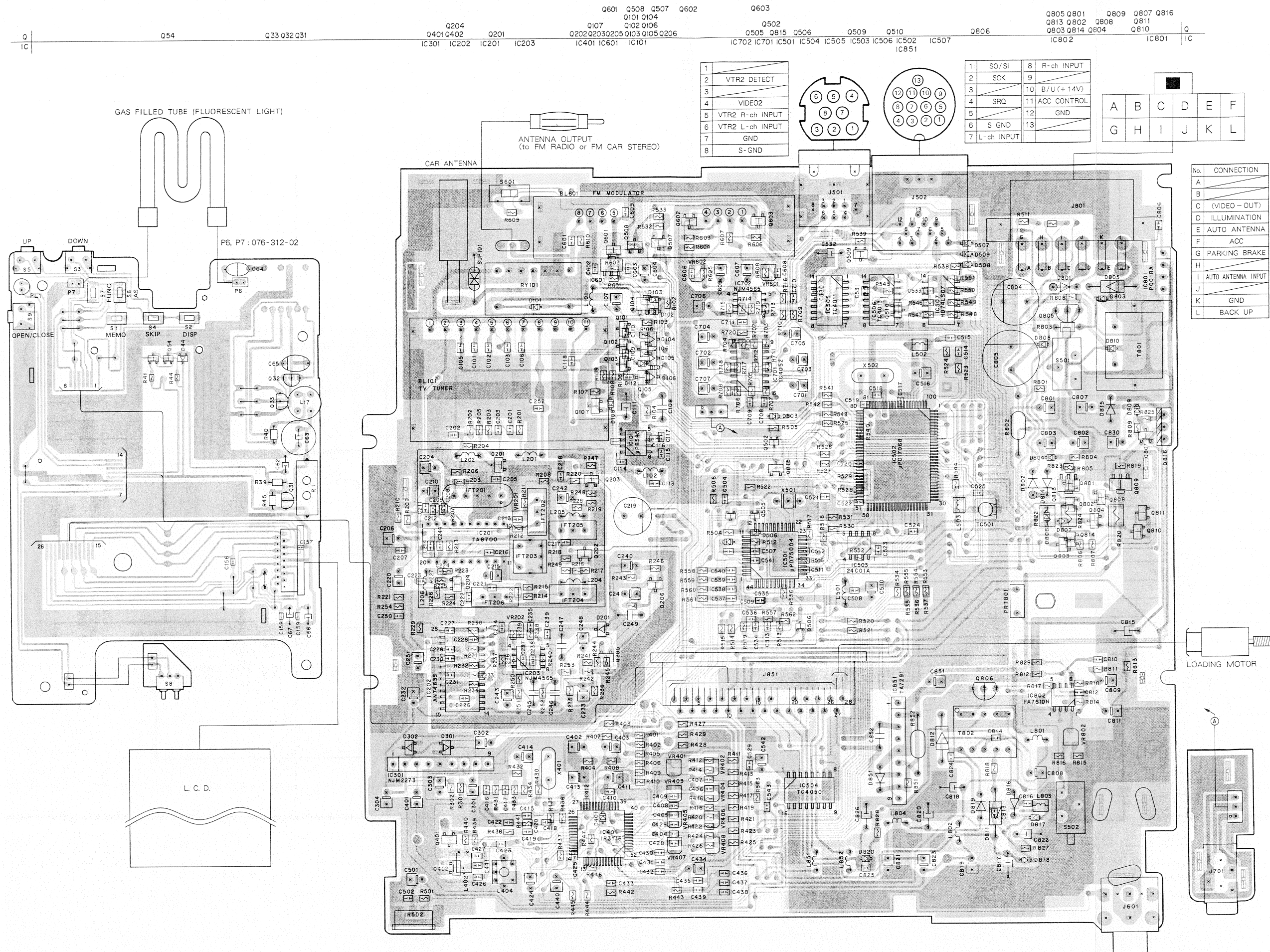
CIRCUIT DIAGRAM 2/3



K00	1
K01	2
K02	3
K03	4
K04	5
K05	6
K06	7
K07	8
K08	9
K09	10
K10	11
K11	12
K12	13
K13	14
K14	15
K15	16
K16	17
K17	18
K18	19
K19	20

T0-3/3 SWITCH PWB





CIRCUIT DIAGRAM 3/3

